

ARBORICULTURAL IMPACT ASSESSMENT

98 Mackenzie Street,
Revesby
NSW



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1. DISCLAIMER

This document in its entirety is for the exclusive use of the client of Treerepairs only.

Treerepairs will not be held liable for any use or interpretations from any other person or third party.

This report remains the intellectual property of Treerepairs and any individual or company must have written consent prior to its use for any other purpose.

All inspections and assessments were carried out using Visual Tree Assessment methods (VTA) from ground level only and do not include the use of diagnostic devices.

Although great care is taken to accurately diagnose the condition of the tree, using accepted industry practices; the arborist is limited in determining the exact structural integrity of the tree by interpreting mainly exterior features.

There are multiple factors both physical and environmental such as extreme climatic events and conditions that could lead to possible structural failures in trees which would not have been possible to predict or identify from VTA methods and assessments.

Any protection or preservation methods recommended are not a guarantee of tree survival or safety but have been recommended to improve vigour or reduce risk only.

Treerepairs does not accept any liability for any tree failure, illness, damage, or injury caused by any undetected or unpredicted faults or failures in any tree or part thereof referred to in this document.

Treerepairs also accepts no responsibility for any failure, loss or decline, damage or injury caused by any tree covered in this document due to any meteorological or other unforeseen events.

It is the clients' responsibility to maintain on going inspections and assessments of trees covered in this document and obtain the services of suitably qualified arborists to carry out the work where necessary.

All work should be carried out according to the Australian Standard 'AS:4373-2007' Pruning of Amenity Trees'.

This document and its recommendations are only valid for 12 months from the submission date of the document.

2. SCOPE OF WORK

2.1 REQUESTED ARBORICULTURAL WORK

On 16th May 2024, Mr Francesco & Mrs Fruci commissioned Treerepairs to prepare an Arboricultural Impact Assessment (AIA) for the proposed development of 98 Mackenzie Street, Revesby.

2.2 TREE SURVEY

As part of this AIA, it was necessary to conduct a standard arboricultural survey on five trees. Refer to 'Tree Schedule' in Chapter 6 for details.

Site vegetation that was not surveyed and determined to be shrub-like in nature (less than 4 meters in height) was not assessed as part of this document.

The survey identified tree species while assessing tree condition and estimating age class. The tree's physical parameters were measured, and its heritage, ecological and amenity value was determined. The relevant data collected was analysed and an unbiased retention value was awarded to the subject tree.

2.3 SRZ & TPZ CALCULATIONS

The data collected from the survey was used in conjunction with formulas outlined in the Australian Standard 'AS:4970-2009 Protection of Trees on Development Sites' to calculate the subject tree's Structural Root Zone (SRZ) and Tree Protection Zone (TPZ).

The SRZ has been provided to identify areas where subterranean encroachments will compromise structural roots and weaken the trees anchoring to the ground.

The TPZ has been provided so that trees to be retained for the long term are adequately protected throughout the development.

2.4 CONSTRUCTION IMPACTS

SRZ and TPZ calculations can then be overlaid on proposed development plans to identify potential demolition or construction works which will compromise either the trees' health and/or stability.

2.5 TREE PROTECTION

Any guidelines for tree protection strategies detailed within this report use AS:4970-2009 tree protection formulas as a guide for reference. These guidelines must be strictly followed to maintain the current health, vigour and vitality of every tree designated for retention.

3. EXECUTIVE SUMMARY

This Arboricultural Impact Assessment (AIA) has been prepared for 98 Mackenzie Street, Revesby. The subject site lies in the Local Government Area (LGA) of Canterbury - Bankstown.

The proposed development of this site is a 'Torrens Title Sub-division' which includes the demolition of existing structures and the removal of one council street tree. This is to be followed by the construction of a new two storey 'Attached Dual Occupancy' with shared 'Driveway' and new shared 'Driveway Crossover'.

All trees assessed are subject to the requirements of 'Canterbury/Bankstown Tree Management Order 2012'.

A tree survey was conducted on 17th May 2024 and concerns five trees. The summary of their assessment is as follows:

Tree 1: Weeping Bottlebrush (*Callistemon viminalis*)

Tree 1 is a Council Street tree which is growing on the nature strip at the front of subject site.

Tree 1 has been proposed for removal to facilitate the proposed 'Driveway Design'.

Tree 1 will require consent from Local Council before it can be removed. Tree 1 is to be assessed for removal by council as part of the sites Development Application (DA).

Tree 2: Lemon Scented Gum (*Corymbia citriodora*)

Tree 2 is a mature tree growing in the front yard of the subject site.

Tree 2 is considered a significant tree with a 'Moderate - High Retention Value'.

Tree 2 is to be retained and protected as part of the proposed development.

Tree 2 can expect possible TPZ encroachments from the proposed demolition of existing structures. Refer to Appendix 11 for specific details.

To avoid any unnecessary root compaction it is imperative that no heavy machinery being used in the demolition process of the existing dwelling enter into Tree 2's calculated TPZ.

Tree 2 can also expect TPZ encroachments from the new 'Driveway Construction' and excavation for new 'Stormwater Infrastructure'. Refer to Appendix 13 and Appendix 14 for specific details.

The total area of TPZ encroachment (footprint) for these works is greater than 10% of the calculated TPZ and considered significant.

The machinery used for any excavation within the TPZ, must be light in nature and performed under strict arborist supervision.

It is recommended that the new driveway be constructed as close to the existing grade as possible using permeable materials. It is recommended that any excavation works within Tree 2's TPZ be performed using hand tools.

TPZ fencing complying with AS:4970-2009 will be required to ensure physical protection to the subject tree. Fencing is to be installed before demolition and is to remain in place throughout the duration of the project.

Refer to Tree Protection recommendations in Chapter 9, Appendix 10, Appendix 15, and Appendix 16 for specific details.

Tree 3: Lemon Scented Gum (*Corymbia citriodora*)

Tree 3 is a mature tree growing in the rear yard of the subject site.

Tree 3 is considered a significant tree with a 'Moderate - High Retention Value'.

Tree 3 is to be retained and protected as part of the proposed development.

Tree 3 can expect TPZ encroachments from the proposed demolition of existing structures. Refer to Appendix 11 for specific details.

To avoid any unnecessary root compaction it is imperative that no heavy machinery being used in the demolition process of the existing dwelling enter into Tree 3's calculated TPZ.

Tree 3 can expect TPZ encroachments from foundations of 'Dwelling B'. These encroachments have been calculated as less than 10% of Tree 3's TPZ and are considered acceptable using AS:4970-2009 as a guide for reference.

Tree 3 can also expect TPZ encroachments from the new 'Driveway Construction' and excavation for 'Stormwater Infrastructure'. Refer to Appendix 13 and Appendix 14 for specific details.

The total area of TPZ encroachment (footprint) for these works is greater than 10% of the calculated TPZ and considered significant.

The machinery used for any excavation within the TPZ, must be light in nature and performed under strict arborist supervision.

It is recommended that the new driveway be constructed as close to the existing grade as possible using permeable materials. It is recommended that any excavation works within Tree 3's TPZ be performed using hand tools.

TPZ fencing complying with AS:4970-2009 will be required to ensure physical protection to the subject tree. Fencing is to be installed before demolition and is to remain in place throughout the duration of the project.

Refer to Tree Protection recommendations in Chapter 9, Appendix 10, Appendix 15, and Appendix 16 for specific details.

Tree 4: Prickly-leaved Paperbark (*Melaleuca nodosa*)

Tree 4 is a semi-mature site tree growing in the south-east corner of the subject sites rear yard.

Tree 4 has been proposed for retention. TPZ fencing complying with AS:4970-2009 will be required to ensure physical protection to the subject tree. Fencing is to be installed before demolition and is to remain in place throughout the duration of the project.

Refer to Appendix 10 and Appendix 13 for further details.

Tree 5: Weeping Bottlebrush (*Callistemon viminalis*)

Tree 5 is a semi-mature site tree growing in the south-east corner of the subject sites rear yard.

Tree 5 has been proposed for retention. TPZ fencing complying with AS:4970-2009 will be required to ensure physical protection to the subject tree. Fencing is to be installed before demolition and is to remain in place throughout the duration of the project.

Refer to Appendix 10 and Appendix 13 for further details

4. METHODOLOGY

This report is based on tree data collected from the subject site on 17th May 2024.

Individual tree data and any relevant observations have been recorded, tabled, and presented within this Arboricultural Impact Assessment report (AIA).

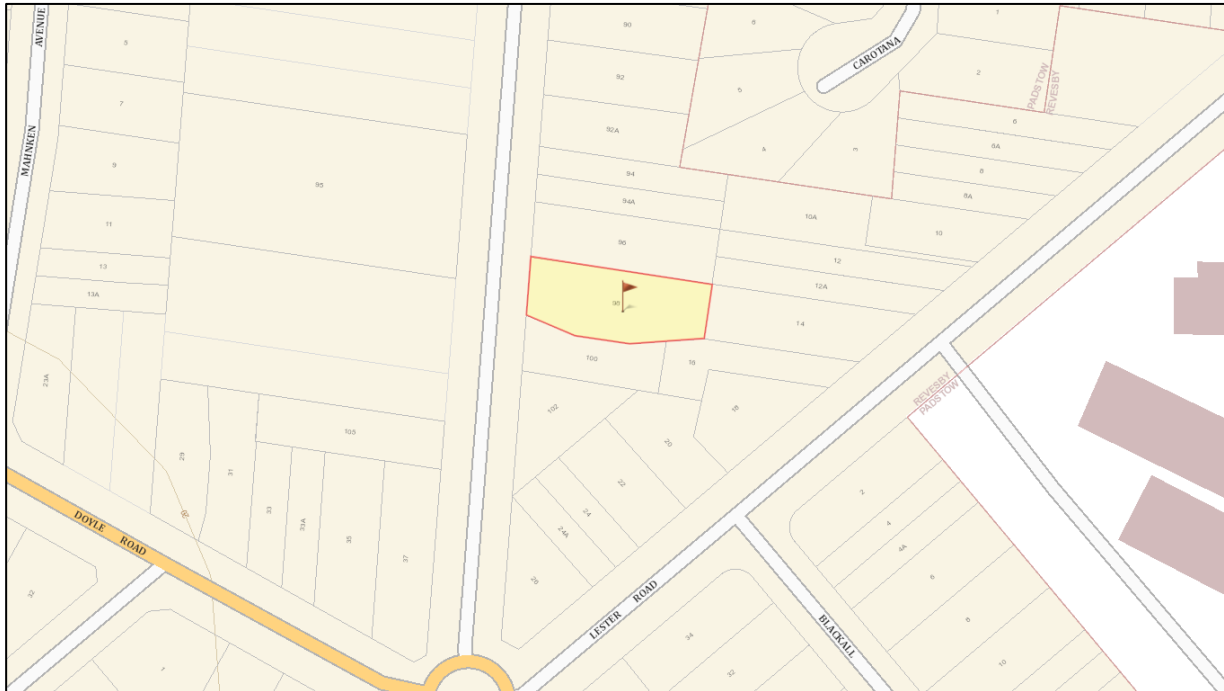
Collected tree data and arboricultural observations were made using the following methods:

- Site plans supplied on behalf of the client on 11th May 2024, and 22nd May 2025,
- No root mapping, ground excavations, soil sampling, woody tissue testing or dissecting, or any other kind of invasive testing was performed for this report,
- Tree inspections were conducted by means of Visual Tree Assessment (VTA),
- All inspections and measuring tasks were performed from ground level,
- All trees are provided with an identification number for reference purposes,
- Tree was identified using 'Field Guide to The Native Plants of Sydney' (Revised 3rd Edition, by Les Robinson), NSW Flora Online (The National Herbarium of NSW, Royal Botanical Gardens, Sydney), and 'Picture This' Application,
- Observations of tree health, vigour and condition were made by using canopy spread, canopy cover, canopy density, foliage size, foliage colour, extension growth, epicormic growth, presence of dieback, presence and volume of deadwood and the presence of any major pests or diseases as indicators,
- Each tree was visually inspected for the presence of wildlife, existing wildlife habitat, and any wildlife habitat opportunities,
- Tree diameter at Breast Height (DBH) was calculated by measuring tree stem circumference at 1.4m above ground level, then dividing that by Pi,
- Tree canopy spread was measured in meters in all cardinal directions,
- Height of all trees was estimated from extensive prior experience,
- Useful Life Expectancy (ULE) methodology was used to find relative ratings for each tree within and around the site,
- Landscape Significance for each tree within and around the site was determined by assessing their Heritage, Ecological and Amenity values,
- Retention Values were determined for site trees only using the determined ULE and Landscape Significance rating results as a primary consideration,
- Site maps were sourced through NSW Six Maps 2024,
- Aerial photographs sourced through Google Earth 2024,
- Site photographs were taken on 17th May 2024 by N. Maynard.

The arboricultural conclusions and recommendations made in this report are based on findings and observations collected using this method of survey/assessment.

5. SITE DETAILS

5.1 SITE LOCATION MAP



MAP 1: Site location map (NSW Sixmaps 2024).

5.2 SITE AERIAL IMAGE - TREE LOCATION



AERIAL IMAGE 1: Tree Location (NSW Sixmaps 2024).

6. TREE SCHEDULE

	GENUS & SPEICES	COMMON NAME	AGE CLASS	HT (m)	DBH (cm)	CANOPY SPREAD (m)				OVERALL HEALTH & VIGOUR	GENERAL STRUCTURE & FORM	USEFUL LIFE EXPECTANCY (ULE)	LANDSCAPE SIGNIFICANCE			RETENTION VALUE	SRZ RADIUS (m)	TPZ RADIUS (m)	PROPOSED ACTION
						N	E	S	W				HERITAGE	ECOLOGICAL	AMENITY				
1	<i>Callistemon viminalis</i>	Weeping Bottlebrush	Mature	9	53	3	3	3	3	Good / Fair	Good / Good	5 - 10 Years	Low	Low	Low	Third-party Owned	2.53	6.36	Remove
2	<i>Corymbia citriodora</i>	Lemon Scented Gum	Mature	25	93	8	2	8	1 2	Good / Good	Good / Good	20 - 40 Years	Low	Low	Moderate	Moderate - High	3.21	11.16	Retain & Protect
3	<i>Corymbia citriodora</i>	Lemon Scented Gum	Mature	20	90	8	8	8	2	Good / Good	Good / Good	20 - 40 Years	Low	Low	Moderate	Moderate - High	3.17	10.80	Retain & Protect
4	<i>Melaleuca nodosa</i>	Prickly-leaved Paperbark	Semi - Mature	4	18	2	2	2	2	Good / Good	Good / Good	5 - 10 Years	Low	Low	Low	Low	1.61	2.16	Retain & Protect
5	<i>Callistemon viminalis</i>	Weeping Bottlebrush	Semi - Mature	4	18	2	2	2	2	Good / Fair	Good / Good	10 - 20 Years	Low	Low	Low	Low	1.61	2.16	Retain & Protect

TABLE 1: Tree schedule (Data collected May 2024).

7. DISCUSSIONS

7.1 DEVELOPMENT PROPOSAL

The proposed development of 98 Mackenzie Street, Revesby is a 'Torrens Title Sub-division'. The development proposal includes the demolition of existing structures, the removal of one council street tree. This is to be followed by the construction of a new two storey 'Attached Dual Occupancy' with new shared 'Driveway' and new shared 'Driveway Crossover'.

Following construction activities, a proposed 'landscaping plan' including new tree and new shrub plantings will be implemented throughout the site. Refer to Appendix 17 for specific details.

7.2 LEGISLATION REVIEWED

To ensure all legal requirements are met when determining which trees can be retained or removed on this development site several Local Government Area (LGA) Policies and documents were reviewed:

- Canterbury/Bankstown Tree Management Order 2012,
- Bankstown Development Control Plan (DCP) [Year] Part B11,
- State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017,
- Environmental Protection and Biodiversity Conservation Act 2016.

7.3 TREE VALUE & SIGNIFICANCE

7.31 Useful Life Expectancy (ULE)

A Useful Life Expectancy (ULE) has been awarded for each of the five trees.

The method Treerepairs uses in determining the for ULE of any amenity tree was developed by Jeremy Barrell in 1996. ULE is the safe 'with an acceptable level of risk' life expectancy of a tree modified by economic considerations.

The objective of a ULE assessment is to determine the relative value of individual trees for the purpose of informing future management options. Trees that remain in an amenity landscape can have their ULE managed by regular tree maintenance and inspections.

7.32 Landscape Significance

The subject trees have had their landscape significance considered and determined.

The significance of an individual tree within a certain landscape is determined by combination of amenity, environmental and heritage factors, which include the importance and value it offers the local area and the community.

It has been determined assessed trees which require removal are not classified as being part of a vulnerable, threatened, or endangered ecological community that is currently providing habitat for native fauna classified as vulnerable or threatened under the Biodiversity Conservation Act 2016.

7.33 Retention Value

A trees retention value is increased or diminished based on its sustainability in the landscape, which is expressed within a trees ULE.

A tree that has a high Landscape Significance rating, but low remaining ULE, has a diminished value for retention and therefore has appropriate the Retention Value assigned. Conversely trees with a low Landscape Significance rating, even with a long remaining ULE, are considered to have a diminished value for retention.

7.4 CONSTRUCTION IMPACTS

7.41 General Information

Despite the best intentions and most stringent tree protection measures, trees may still be injured during construction.

During construction, trees can be damaged by causes such as soil compaction, water/petroleum pollution, grade changes, root crushing and pruning, damage to the bark, improper pruning of branches, incorrect storage of construction machine/equipment/materials, and dumping of construction wastes.

A trees response to construction related impacts can be varied can often take years to visibly notice any symptoms and damage can be permanent and often irreversible. Some trees decline slowly over years while others may die instantly.

Sometimes tree foliage may wilt or change color and often twig and branch dieback will occur. Trees can slowly lose growth vigor and become more susceptible to pests and diseases.

Remedial treatments for injured trees are few, and trees generally don't recover from this point and slowly continue to decline until they eventually die.

Tree age, health, and vigor all play roles in how tolerant a tree will be to construction site impacts. Mature trees and over mature trees suffer more from construction related impacts than a young or semi-mature tree at its peak growing stage of life.

7.42 Site Activities Impacting Trees

The best method of tree protection is in the prevention of impacts such as compaction, contamination, and other soil disturbances. Protection to any tree on a construction site is detrimental to its preservation.

The following construction site activities will require constant consideration from contractors:

- Mechanical damage from plant/machinery; The direct wounding and damage of stems and branches by large plant and machinery, including excavator, bob cat, crane, etc., during construction. These activities cause cambium damage/abrasion to tree trunks and branch tearing well into collar attachments in turn exposing live woody tissue and predisposing the tree to pest and disease. Similarly, plant/machinery is also responsible for soil compaction.
- Indirect root injury from soil compaction; When soil is compacted either via building materials/debris stockpiled on the TPZ or TPZ is utilized as a thoroughfare for heavy plant and machinery, the soil inevitable becomes compacted and impacts on the air and moisture uptake. Ultimately affecting the gaseous exchange within the drip line that is vital for the tree health.
- Soil contamination; Where chemicals, cement, and paint products etc., get washed or spilled into the soil and the tree absorbs the soluble content through its roots, in addition limes from cement wash off can alter the soil PH.

Sometimes symptoms can be discovered in trees far from the source contamination source. Above and below ground, natural, or unnatural drainage courses can transport for contaminants leeching into the ground.

- Soil grade changes; When the topsoil cover down to a depth of approximately 150mm is striped it can eliminate vital feeder roots and can temporarily shock the tree. This process is common particularly during the landscape process, in addition these fine roots if exposed can prematurely dehydrate and die. Raising or reducing soil levels or surface sealing can lead to reduced soil oxygen and water levels which can also lead to tree decline and often death (Harris, Clarke & Matheny 2004).
- Landscaping Impact; Side paths and driveways comprised of concrete and non-porous materials can deprive roots of air and water and affect gaseous exchange. This is particularly true when there has been lack of consideration for trees located on adjacent properties and within proximity to the building envelope.

7.5 ROOT CONSIDERATIONS

7.51 Root Spread

Roots grow where roots want to grow. The actual spread depends on several deciding factors; tree species, soil type, natural drainage courses, land topography, location to structures both natural and handmade, and other factors affecting a trees microclimate.

When the conditions are uniform around a tree, roots systems can be predicted with a degree of accuracy. When conditions are variable the extent of the root systems can be irregular and asymmetrical.

Generally, tree roots will extend beyond tree canopy line and the majority are within 500mm from the ground surface, but occasionally they will penetrate deeper in search of water and nutrients.

7.52 Anchor Roots

Demolition and construction work associated with this development proposal can be performed successfully without the disturbance to retained trees anchor roots if protection guidelines are followed.

Trees anchor roots are generally located closest to the basal area. This area can be referred to as the trees 'root plate' or 'root ball' and is comprised of a large subterranean woody root mass that provides the tree with structural support and anchoring to the ground. These roots should never be severed or disturbed as it will weaken the trees stability dramatically.

7.53 Transport Roots

Beyond the anchor roots, are smaller woody roots known as transport roots. These smaller diameter roots branch off from anchor roots (hydrotropic). Their main function is to conduct water and nutrients from the non-woody feeder roots to the tree.

7.54 Feeder Roots

The main area for surface feeding roots to occur is from the tree trunk to the outer canopy known as the drip zone. These fibrous roots are less likely to occur under or near other buildings, as there is little surface moisture or soil air presence for root

survival. These roots are very fine in structure, typically sensitive, less than 0.5mm diameter and short lived.

Feeder roots are vulnerable to damage, and once it occurs, water and nutrient uptake will be restricted until new ones are produced. Vigorous young trees will be capable of rapid regeneration, but more mature to over mature trees will respond much slower.

7.55 Importance of Protecting Roots

Root damage from construction activities is a leading cause of decline for trees in amenity areas. Major causes of soil compaction are due to vehicular movements and the storage of heavy machinery/equipment/materials near a preserved tree.

It is important to prevent soil compaction by diverting traffic routes and designating storage areas away from trees. Mechanical damage of tree trunk or surface roots or spillage of chemicals can also cause irreparable damage.

A healthy tree may be able to sustain a loss of between 30% and 50% of absorbing roots (Harris, Clark, Matheny, 1999). It should be reiterated that this figure refers to the fine roots responsible for the absorption of water and nutrients and not the major roots closer to the trunk that are responsible for the structural integrity of the tree.

The loss of absorbing root system will immediately affect the water status of the tree and may, depending on season and water availability, create a water stress for the tree.

7.55 Tree Dripline

A tree's dripline is an area where a tree is most vulnerable to construction activities and needs to be treated as if a TPZ.

The perimeter of a tree dripline is where the important feeder roots are generally more prolific. It is where they are absorbing the most in water and nutrients and need to be left as undisturbed as possible. These delicate feeder roots are extremely sensitive, and their vitality will have a reflection on tree health and vigour.

Each tree to be retained shall have a designated TPZ identifying the area sufficiently large enough to protect it and its roots from disturbance.

To ensure root impact to retained trees is kept to an absolute minimum TPZ guidelines outlined in AS:4970-2009 must be adhered to.

7.6 TREE PROTECTION ZONES

7.61 General Information

The SRZ is the area required for tree stability. It exists inside the TPZ. The SRZ is not to be disturbed in anyway without Project Arborist approval.

TPZ distances are designed to preserve sufficient root mass to avoid any (permanent) reduction of tree health resulting from development works, and there for allowing the tree to be retained in similar condition as it currently exists.

7.62 TPZ Encroachment

It can be possible to slightly encroach, or make minor variations to the standard TPZ.

A minor TPZ encroachment area is considered less than 10% of the entire TPZ area and is outside the SRZ.

In almost all cases, where intrusion into a TPZ is intended it is usual practice to require the extension of TPZ by a similar amount in other directions. In this case the proposed encroachments for all trees can be compensated for.

7.7 TREE PROTECTION METHODS

7.71 General Information

Any tree that has been nominated for retention, will require protection considerations regardless of its retention value. This includes site trees, council trees and private trees on and around the construction site.

Tree protection normally starts by first calculating the size and location of a trees SRZ and TPZ.

Each tree is individually assessed against possible construction related impacts from the proposed development proposal. These results are then used to recommend appropriate and feasible solutions with tree protection being one of the primary factors used in development considerations.

The tree schedule provided in this report provides the TPZ & SRZ dimensions of each tree utilising calculation methodology set out in the AS:4970-2009 The TPZ for any retained trees should be included on all site plans.

Contractors are required to familiarise are made aware of the importance of this SRZ 's and TPZ's.

Installation of physical tree protection will be required before demolition or construction commences.

Any stem wrapping or fencing protection installed must comply with guidelines outlined within AS:4970-2009.

If modification to tree protection placement or position is required or any mechanical excavation works, canopy pruning, root pruning or other identified impact activities within the TPZ, supervision shall be required by a suitably qualified arborist.

8. CONCLUSIONS

As part of the development proposal of 98 Mackenzie Street, Revesby it was necessary to prepare an AIA for five trees. The following conclusions have been made for each of tree:

- Tree 1 is a council street tree growing on the nature strip. Tree 1 is to be removed to facilitate the proposed 'Dwelling A Driveway Design'. Tree 1 is to be assessed for removal by local council as part of the sites DA.
- Tree 2 is a site tree growing on the western corner of the subject site. Tree 2 is expected to experience TPZ encroachments greater than 10% during proposed driveway construction activities and excavation for new stormwater infrastructure. Tree 2 can be successfully retained with protection considerations including a root friendly driveway design and TPZ fencing to AS:4970-2009. Refer to Chapter 9 - Recommendations, Appendix 10, and Appendix 14 for further details.
- Tree 3 is a site tree growing on the western corner of the subject site. Tree 3 is expected to experience TPZ encroachments greater than 10% during proposed dwelling and driveway construction activities and excavation for new stormwater infrastructure. Tree 3 can be successfully retained with protection considerations including a root friendly driveway design and TPZ fencing to AS:4970-2009. Refer to Chapter 9 - Recommendations, Appendix 10, and Appendix 14 for further details.
- Tree 4 is a site tree growing on the eastern boundary the subject site. Tree 4 is not expected to experience TPZ encroachments during proposed demolition and construction activities. Tree 4 can be successfully retained with protection considerations including TPZ fencing to AS:4970-2009. Refer to Appendix 10 and Appendix 14 for further details.
- Tree 5 is a site tree growing on the eastern boundary the subject site. Tree 5 is not expected to experience TPZ encroachments greater than 10% during proposed demolition and construction/excavation activities. Tree 5 can be successfully retained with protection considerations including TPZ fencing to AS:4970-2009 and supervised excavation within its calculated TPZ. Refer to Appendix 10, Appendix 14, and Appendix 15 for further details.

9. RECOMMENDATIONS

Recommendations are based on conclusions that have been made in accordance with the Australian Standard AS:4970-2009 Protection of Trees on Development Sites.

- The proposed removal of Tree 1 will require consent from local Council. This tree is to be assessed for removal by Council as part of the site DA process.
- It is recommended that all trees removed as part of this sites' development be adequately replenished using replacement species that are encouraged by Local Council.
- In order to maintain high arboricultural standards and high site safety standards any tree work performed on this site must comply with AS:4373-2007 Pruning of Amenity Trees. It is recommended that contractors undertaking tree works on this site must have appropriate qualifications and expertise in relation to removing or pruning of trees.
- It is recommended that the new driveway be constructed using permeable materials and be constructed as close to the existing ground level as possible. Geo-tech fabric is to be used as a membrane to divide any retained transport and feeder roots of Tree 2 and Tree 3 from direct contact with driveway construction materials.
- Further protection considerations for Tree 2 and Tree 3 include the preparations and the installation for the proposed driveway works. Recommendations include that any formwork or edging for the planned driveway to take in consideration all significant roots (Roots greater than 30mm diameter). Structural roots and transport roots must not be disturbed or severed during driveway crossover construction.
- The existing ground level over where the proposed new driveway is to be located should only be lowered by removing no more than 150mm of organic matter. Removal of soil for new driveway preparations should only be performed using hand tools to avoid root damage and limit root disturbance.
- It is also recommended that any excavation for new 'Stormwater Infrastructure' within the calculated TPZ of Tree 2, Tree 3 and Tree 5 be performed under the supervision of a nominated Project Arborist to prevent damage or severing of significant roots.
- It is recommended that fence protection complying with AS:4970-2009 be installed around Tree 2, Tree 3, Tree 4, and Tree 5 prior to commencement of demolition. Fence protection is to stay undisturbed for the duration of the development to avoid unnecessary physical impacts to nominated TPZ.

10. REFERENCES

1. Standards Australia - Pruning of Amenity Trees (AS:4373-2007).
2. Standards Australia - Protection of Trees on Development Sites (AS:4970-2009).
3. Barrell, J. (1996), Safe Useful Life Expectancy of Trees (SULE). Barrell Tree Care. UK.

11. APPENDICES

APPENDIX 1 - DEFINITION OF HEALTH CLASSIFICATIONS

TERM	DEFINITION
EXCELLENT	The tree is demonstrating excellent or exceptional growth. The tree should exhibit a full canopy of foliage and be free of pest and disease problems.
GOOD	The tree is demonstrating good or exceptional growth. The tree should exhibit a full canopy of foliage and have only minor pest or disease problems.
FAIR	The tree is in reasonable condition and growing well. The tree should exhibit an adequate canopy of foliage. There may be some deadwood present in the crown. Some grazing by insects or possums may be evident.
POOR	The tree is not growing to its full capacity; extension growth of the laterals is minimal. The canopy may be thinning or sparse. Large amounts of deadwood may be evident throughout the crown. Significant pest & disease problems may be evident or symptoms of stress indicating tree decline.
VERY POOR	The tree appears to be in a state of decline. The tree is not growing to its full capacity. The canopy may be very thin and sparse. A significant volume of deadwood may be present in the canopy or pest and disease problems may be causing a severe decline in tree health.
DEAD	The tree is completely dead; exhibits no new growth or live tissue.

TABLE 2: Definitions of tree health class.

APPENDIX 2 - DEFINITIONS OF TREE AGE CLASSIFICATIONS

AGE CLASS	DEFINITION
YOUNG	Tree being in its early life stages of existence, progress, growth, development, or maturity. Approximately 0 – 5 years old.
SEMI-MATURE	Tree is around halfway complete in its natural growth and development stages. It is beginning to take on the characteristic of a fully development tree of the same species, taking into consideration of its growing environment. Approximately 5 – 15 years.
MATURE	Tree is complete in its major natural growth and development. As plant it is pertaining to, or characteristic of full development. Approximately. 15 – 60 years.
OVER MATURE	Tree has completed its natural growth or development. Tree has been maturing for some time and exhibits signs of decline or structural weakening due to its age. Approximately. 30 – 120 years
DECLINE	Tree has completed its life cycle and is dying. Approx. Less than 5 years to live.

TABLE 3: Definitions used in categorising Tree Age Class.

APPENDIX 3 - DEFINITION CATEGORIES OF TREE STRUCTURE

TERM	DEFINITION
GOOD	The tree has a well-defined and balanced crown. Branch unions appear to be strong, with no defects evident in the trunk or the branches. Major limbs are well defined. The tree is considered a good example of the species.
FAIR	The tree has some minor problems in the structure of the crown. The crown may be slightly out of balance, and some branch unions may be exhibiting minor structural faults. If the tree has a single trunk, it may be on a slight lean or exhibiting minor defects.
POOR	The tree may have a poorly structured crown. The crown may be unbalanced or exhibit large gaps. Major limbs may not be well defined. Branches may be rubbing or crossing over. Branch unions may be poor or faulty at the point of attachment. The tree may have suffered root damage.
VERY POOR	The tree has a poorly structured crown. The crown is unbalanced or exhibits large gaps with possibly large sections of deadwood. Major limbs may not be well defined. Branches may be rubbing or crossing over. Branch unions may be poor or faulty at point of attachment. Branches may exhibit large cracks that are likely to fail in the future. Tree may have suffered major root damage.
FAILED	The tree has a very poorly structured crown. A section of the tree has failed or is in imminent danger of failure.

TABLE 4: Definitions used in categorising tree structure.

APPENDIX 4 - USEFUL LIFE EXPECTANCY (ULE) CATEGORIES

CATEGORY	DEFINITION
UNSAFE & REMOVE	The tree is considered dangerous in the location and has no significant amenity value.
LESS THAN 5 YEARS	The tree, under normal circumstances and without extra stresses being imposed on it, should be safe and have value for up to five years, but will need to be replaced. During this period, normal inspections and maintenance will be required. If possible, replacement trees should be planted.
5 – 10 YEARS	The tree, under normal circumstances and without extra stresses being imposed on it, should be safe and of value for up to ten years. During this period, normal inspections and maintenance will be required.
10 – 20 YEARS	The tree, under normal circumstances and without extra stresses being imposed on it, should be safe and of value for up to twenty years. During this period, normal inspections and maintenance will be required.
20 – 40 YEARS	The tree, under normal circumstances and without extra stresses being imposed on it, should be safe and of value for up to forty years. During this period, normal inspections and maintenance will be required.
GREATER THAN 40 YEARS	The tree, under normal circumstances and without extra stresses being imposed on it, should be safe and of value for greater than forty years. During this period, normal inspections and maintenance will be required.

TABLE 5: Categories for Useful Life Expectancy (ULE)

APPENDIX 5 - LANDSCAPE SIGNIFICANCE CATEGORIES

CATEGORY	HERITAGE VALUE	ECOLOGICAL VALUE	AMENITY VALUE
SIGNIFICANT	The subject site is listed as a Heritage Item under the Local Environment Plan (LEP) with a local, state or national level of significance or is listed as a Significant Tree.	The subject tree is scheduled as a Threatened Species as defined under the Biodiversity Conservation Act 2016.	The subject tree has a very large live crown size exceeding 100m ² with normal to dense foliage cover, is located in a visually prominent position in the landscape, exhibits very good form and habit typical of the species.
	The subject tree is a Commemorative Planting having been planted by an important historical person(s) or to commemorate an important historical event.	The tree is a locally indigenous species, representative of the original vegetation of the area and is known as an important food, shelter or nesting tree for endangered or threatened fauna.	The subject tree makes a significant contribution to the amenity and visual character of the area by creating a sense of place or creating a sense of identity.
		The subject tree is a Remnant Tree, being a tree in existence prior to development of the area.	The tree is visually prominent in view from surrounding areas, being a landmark or visible from a considerable distance.
HIGH	The tree has a strong historical association with a Heritage Item (building/structure/art efact/garden etc.) within or adjacent the property and/or exemplifies a particular era or style of landscape design associated with the original development of the site.	The tree is a locally indigenous species, representative of the original vegetation of the area and is a dominant or associated canopy species of an Endangered Ecological Community (EEC) formerly occurring in the area occupied by the site.	The subject tree has a very large live crown exceeding 60m ² ; crown density exceeding 70%, very good representative of the species in terms of form & branching habit, is aesthetically distinctive and makes positive contribution to the visual character and the amenity of value of the area.

MODERATE	The tree has a suspected historical association with a heritage item or landscape supported by anecdotal or visual evidence.	The tree is a locally indigenous species and representative of the original vegetation of the area and the tree is located within a defined Vegetation Link / Wildlife Corridor or has known wildlife habitat value.	The tree is a good representative of the species in terms of its form and branching habit with minor deviations from normal with a crown density of at least 70% (normal); the subject tree is visible from the street and/or surrounding properties and makes a positive contribution to the visual character and the amenity of the area.
LOW	The subject tree detracts from heritage values or diminishes the value of a Heritage Item.	The subject tree is possibly scheduled as exempt under the provisions of this Development Control Plan due to its species, or tree can be a nuisance or its position problematic - relative to buildings or other structures.	The subject tree has a small live crown size of less than 25m ² and can be replaced within the short term (5- 10 years) with new tree planting.
VERY LOW	The subject tree is causing damage to a Heritage Item.	The subject tree is listed as an Environment Weed Species in the Local Government Area, being invasive, or is a known nuisance species.	The subject tree is not visible from surrounding properties and has a negative impact on the amenity and visual character of the area. The tree is a poor representative of the species, showing significant deviations from the typical form and branching habit with a crown density of less than 50%.

TABLE 6: Landscape significance categories

APPENDIX 6 - CALCULATING THE DBH

To determine the Diameter at Breast Height (DBH) of a tree, measure its Circumference at Breast Height (CBH) at 1.4m above the ground. The trees circumference is then divided by π (3.1415) to give the trees DBH.

$$DBH = CBH \div \pi$$

DBH for multi-stemmed trees = Measure DBH for all stems. Consolidate all calculated DBHs into a single index then square root of the final DBH.

APPENDIX 7 - CALCULATING THE SRZ

The SRZ is the area required for tree stability. A larger area is required to maintain a viable tree. There are many factors that affect the size of the SRZ (e.g. tree height, crown area, soil type, soil moisture). The SRZ may also be influenced by natural or built structures, such as rocks and footings.

It is important to note that the SRZ is not related to tree health. It refers to the physical volume of roots required for the tree to remain stable in the ground. It is in no way related to the physiological requirements of the tree but is the minimum volume of roots required for a tree to remain standing (Mattheck & Breloer 1994).

$$SRZ \text{ radius} = (DBH \times 50)^{0.42} \times 0.64$$

APPENDIX 8 - CALCULATING THE TPZ

Calculating and defining a TPZ is the principal means of protecting trees on development sites. It is a combination of both root and crown area that is requiring protection. It is an area isolated from construction disturbance, so that a tree can remain viable.

The TPZ will always incorporate the structural root zone within it. A TPZ should not be less than 2m nor greater than 15m (except where crown protection is required).

The TPZ for palms, cycads and tree is not calculated using this method. For these plants, the TPZ should not be less than 1 meter outside the crown spread.

$$TPZ \text{ Radius} = DBH \times 12$$

APPENDIX 9 - TPZ ENCROACHMENT

General Information

In some circumstances, it may be possible to encroach into or make variations to the standard TPZ. Encroachment includes excavation, compacted fill and machine trenching.

Minor TPZ Encroachment

Minor TPZ encroachment is considered less than 10% of the area of the TPZ and is outside the Structural Root Zone (SRZ). Detailed root investigations should not be required. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ. The project arborist may make variations after considering the circumstances.

The compensation for a minor encroachment is a guideline, and even if the encroachment may be less than 10%, it may not always be an option. Each encroachment must be assessed independently and on its own merit. Examples of minor TPZ encroachment, and the required compensation for that encroachment have been provided in Figure 1.

Major TPZ Encroachment

If the proposed encroachment is greater than 10% of the TPZ or inside the Structural Root Zone (SRZ), the project arborist must demonstrate that the tree(s) would remain viable.

The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ. This may require root investigation by non-destructive methods.

TPZ Compensation Examples for Minor Encroachment

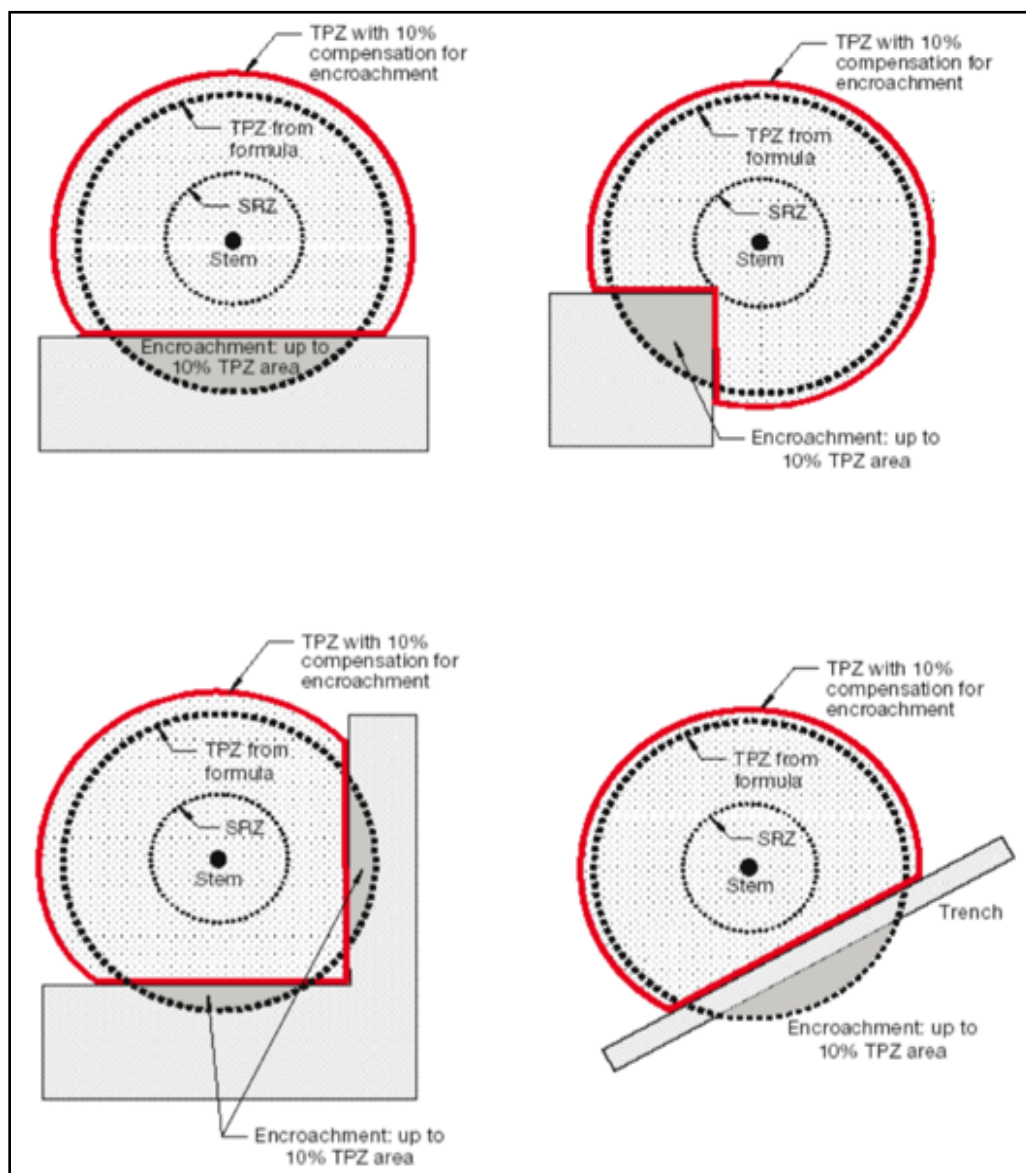


FIGURE 1: Examples of minor TPZ encroachment (Sourced A:4970-2009).

APPENDIX 10 - TREE PROTECTION GUIDELINES

Guidelines for TPZ fencing and stem protection have been detailed in Figure 2 and 3. Tree protection measures shall be implemented prior to commencement of site works and shall remain in place for the development duration.

The TPZ for any retained trees shall be clearly defined and marked out on all relevant site plans. Warning signs shall be attached to the outside of the temporary fencing or stem buffers with the contact details of the project arborist.

Fence Protection

Temporary chain link fence protection panels at least 1.8m high shall be installed around the perimeter of the TPZ to arborist specifications. Materials options for this type of protection can vary and alternatives need to be discussed with a qualified arborist.

Because of the low water holding characteristics of some soils, changes to the trees microclimate can also result in tree water stress during dry periods. It may be necessary to provide a supplementary water supplies or add mulch to reduce soil evaporation and drying out of surrounding root systems and aid in preventing compactions to soil around the tree base.

A 50-100mm layer of coarse organic mulch (preferably forest or eucalypt) should be placed over the surface of TPZ, where possible, to assist in root protection and root stimulation.

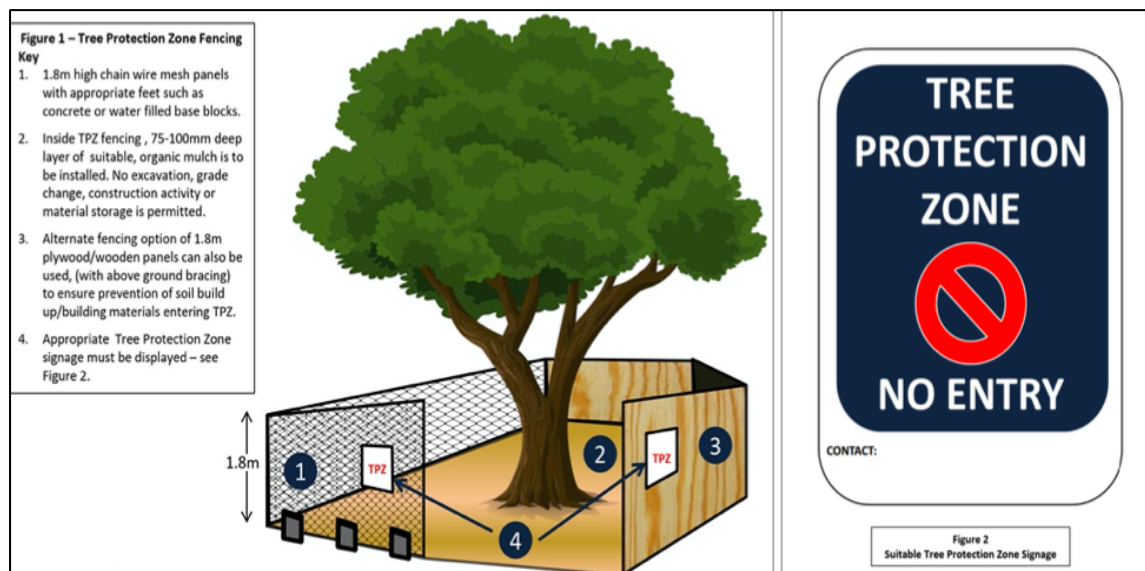


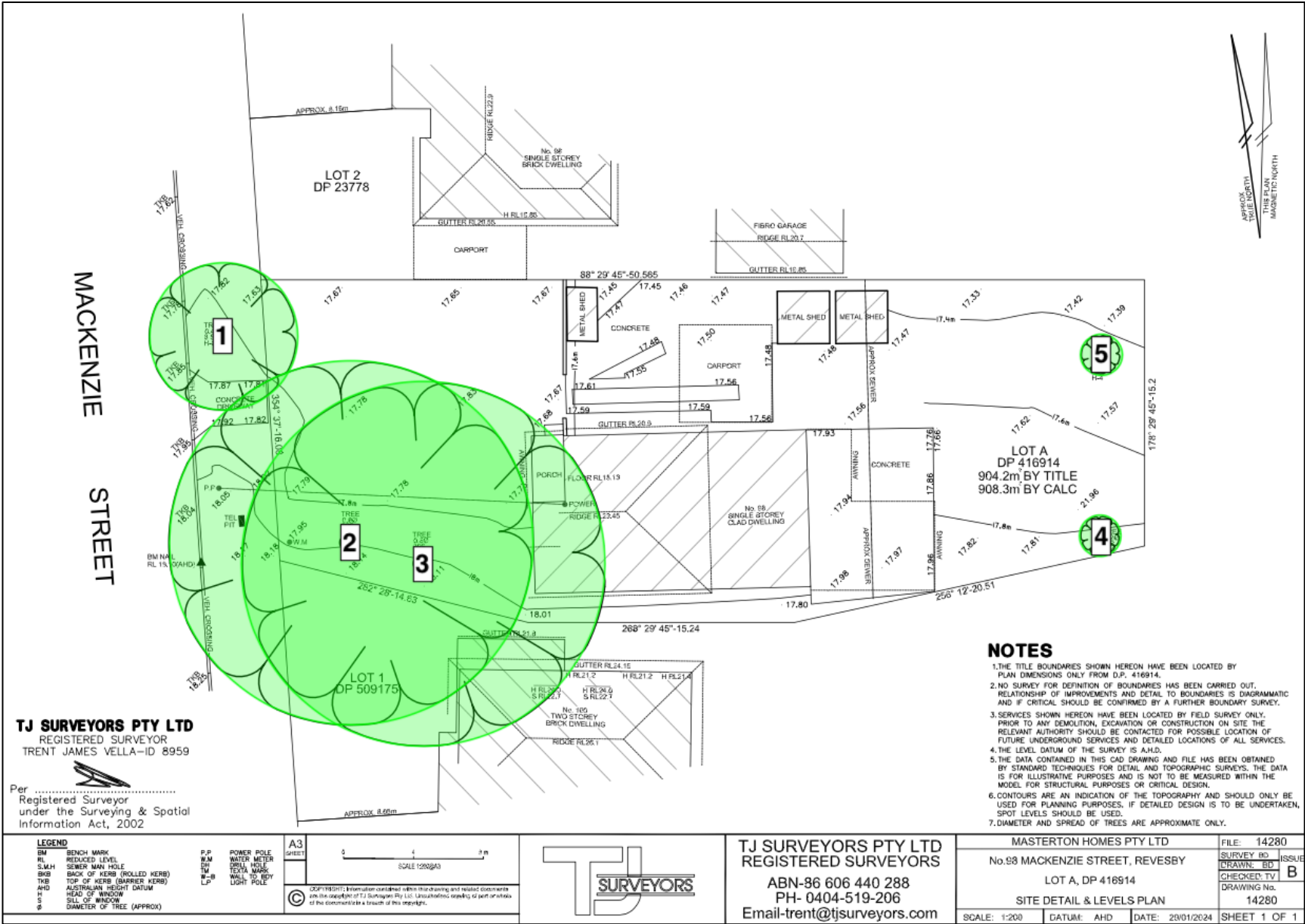
FIGURE 2: TPZ fence protection guidelines to AS:4970-2009.

Encroaching Unfenced TPZ Area

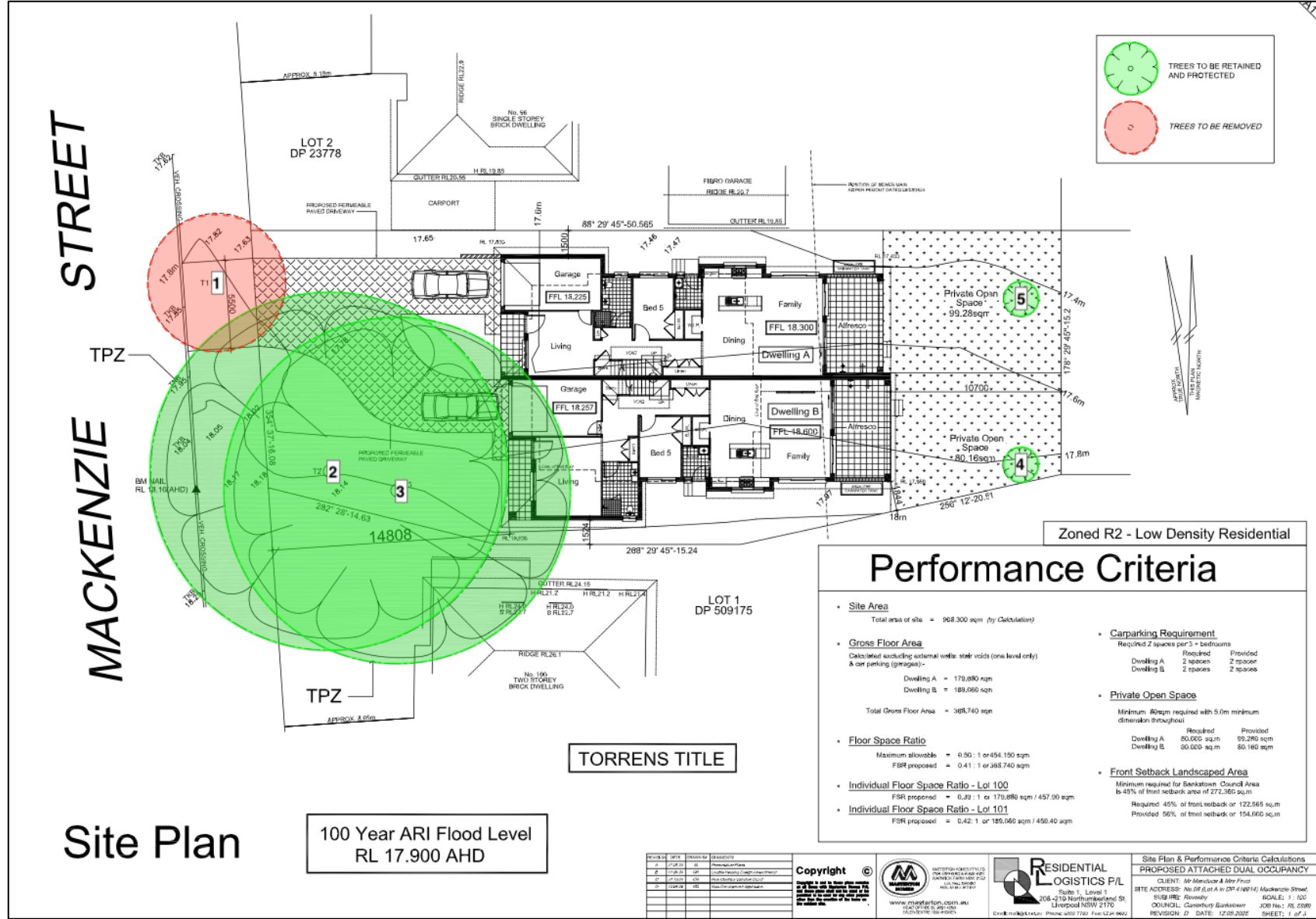
The following activities are prohibited inside the TPZ fence area:

- Excavation, demolition or cultivation using machinery,
- Stockpiling of equipment, materials or spoils,
- Changes to soil levels,
- Installations of site sheds or amenities, erection of hoarding/scaffolds
- Disposal of waste materials and substances,
- Access tracks for vehicles or machinery.

APPENDIX 11 - SITE SURVEY: TREE LOCATION

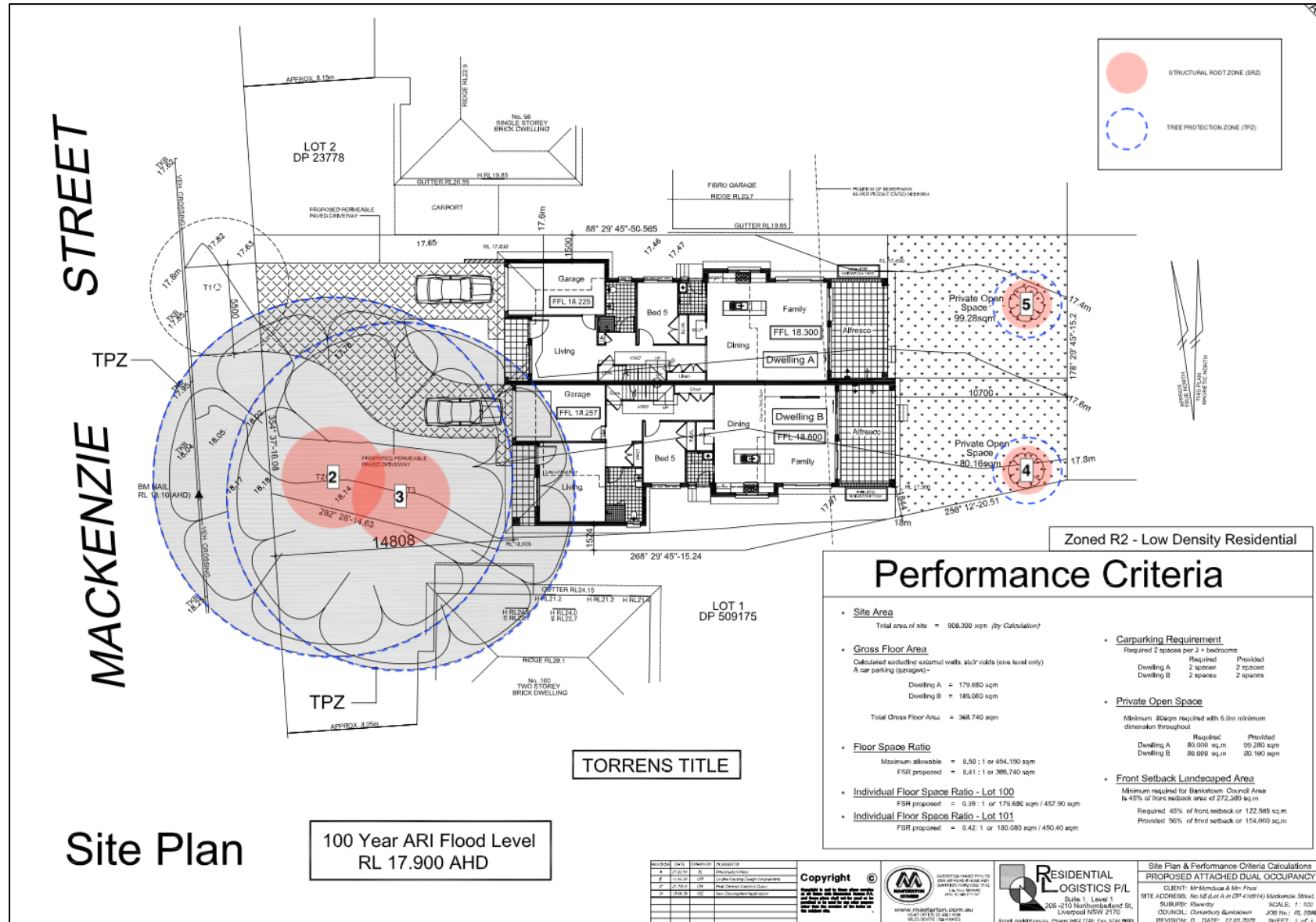


PLAN 1: Site Survey indicating tree location (Plan supplied by client May 2024).



PLAN 2: Site Plan indicating proposed tree removal (Plan supplied by client May 2025).

APPENDIX 13 - SITE PLAN: SRZ & TPZ FOR RETAINED TREES

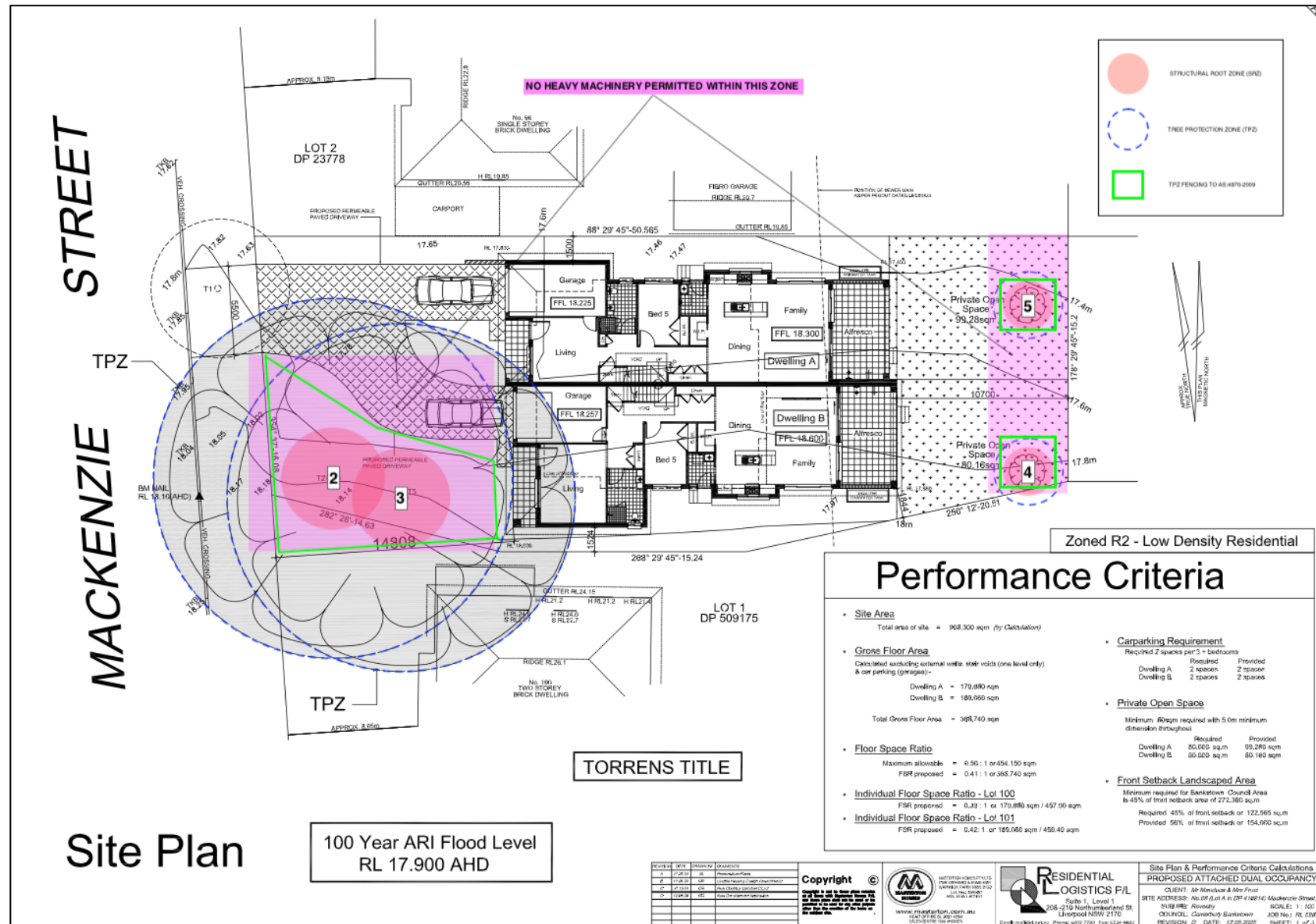


PLAN 3: Site Plan - Calculated SRZ & TP for retained trees (Plan supplied by client May 2025).

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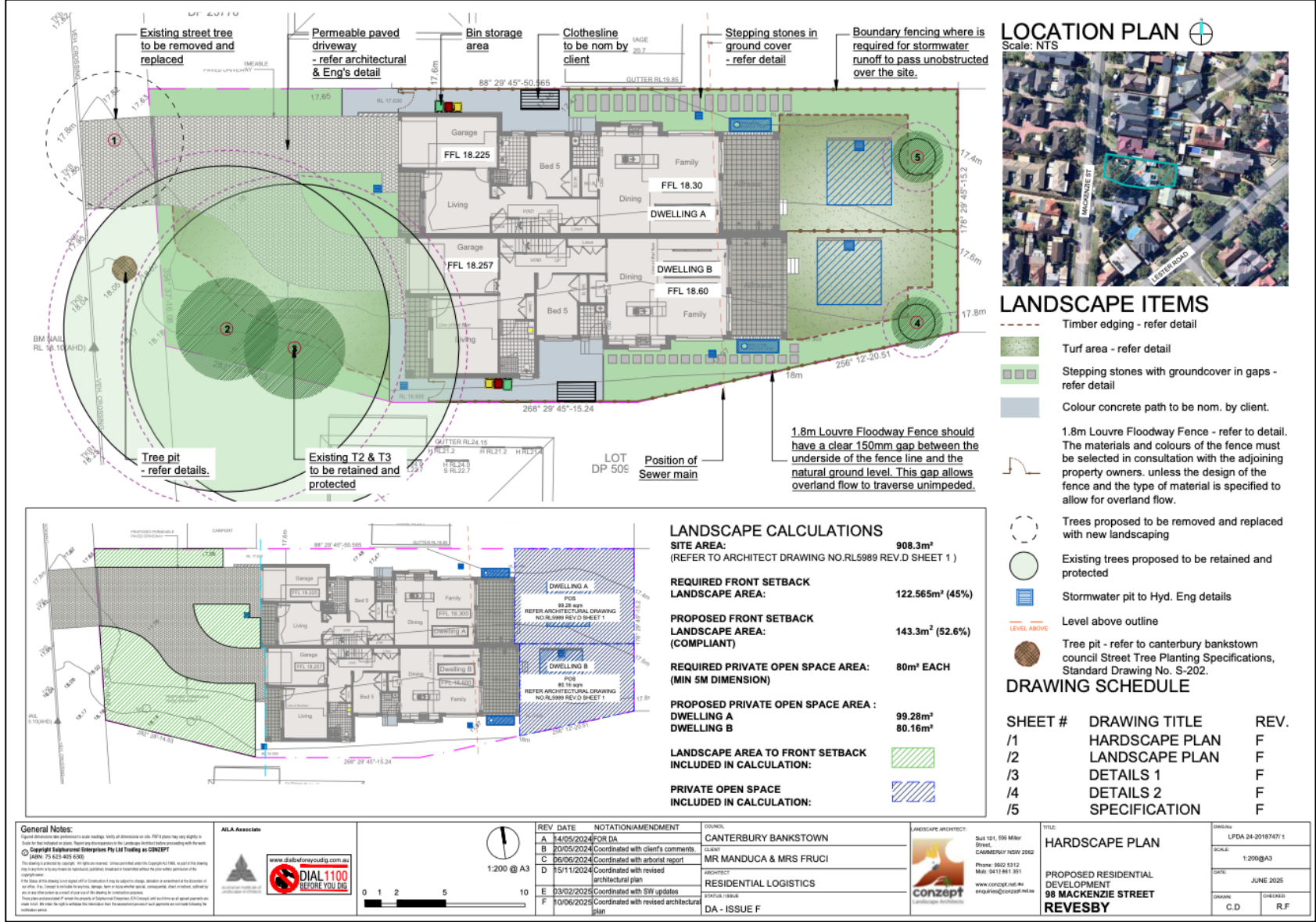
APPENDIX 15 - SITE PLAN: TREE PROTECTION DETAIL 1



PLAN 5: Site Plan - Tree protection detail for retained trees (Plan supplied by client May 2025).

PLAN 6: Hydraulic Detail Plan - Tree protection detail 2 for retained trees (Plan supplied by client May 2025).

APPENDIX 17 - LANDSCAPE PLAN



PLAN 7: Landscape Plan -(Plan supplied by client May 2025).

APPENDIX 18 - IMAGES OF SUBJECT TREES





TREE 4: *Melaleuca nodosa*.



TREE 5: *Callistemon viminalis*.

12. AUTHORS QUALIFICATIONS & EXPERIENCE

The author of this document is a qualified and full-time practicing Consulting Arborist.

- Diploma of Arboriculture,
- AQF Level 5 Arborist
- Director - Treerepairs - 15 years
- Over 25 years arboricultural experience - Tree Contractor & Consulting Arborist
- 20 years Climbing Arborist with National & International experience

If further information relating to the content of this report is required, please do not hesitate to contact the reports' author Nick Maynard on 0449 610 919.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Nick Maynard', with a long horizontal flourish extending to the right.

Nick Maynard